

viral replicon particles, which express the green fluorescent protein gene in cells, indicate the operation of tissue conduits, possibly involving tracheae and visceral muscles, that facilitate virus movement through the basal lamina. Ultrastructural studies of the midgut reveal evidence for possible complete penetration of the basal lamina by tracheal cells and regions of modified basal lamina associated with visceral muscle. The modified basal lamina closely resembles proventricular matrix material known to allow virus passage.

J Med Entomol. 2004; 41(3): 467-75.

FIELD VALIDATION OF *Aedes aegypti* (DIPTERA: CULICIDAE) AGE ESTIMATION BY ANALYSIS OF CUTICULAR HYDROCARBONS

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In previous studies, we developed linear regression models to age-grade female *Aedes aegypti* L. reared and maintained under controlled laboratory conditions. The models were based on temporal differences between two cuticular hydrocarbons, pentacosane (C₂₅H₅₂) and nonacosane (C₂₉H₆₀), which were extracted from *Ae. aegypti* legs and analyzed by gas-liquid chromatography. These initial models predicted adult female age up to 165 DD (12-15 calendar d at 28°C). The age of older mosquitoes, however, could not be accurately predicted. In this study, our original regression models were tested using age data obtained from mosquitoes maintained in a field laboratory and those that were marked, released, and recaptured in northwestern Thailand. Our field data led to the development of two new regression models: one for the cool-dry season (February-March) and one for the rainy season (July-August). Both models resulted in better estimates of age than the original model and thus improved our ability to predict the age of *Ae. aegypti* to 15 calendar d. Females older than 15 d can be identified as such, but their exact age cannot yet be estimated. The new models will be useful for epidemiological studies and evaluating the impact of *Ae. aegypti* control interventions for disease prevention.

J Med Entomol. 2004; 41(2): 231-8.

GEOGRAPHIC INFORMATION SYSTEM AS EPIDEMIOLOGICAL TOOL IN SURVEILLANCE OF DENGUE VIRUS-INFECTED Aedes MOSQUITOES

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A Geographic Information System (GIS) was used as analysis tool to study the spatial distribution of dengue virus-infected *Aedes* mosquitos in Thailand. Global Positioning System (GPS) instruments were used to map villages involved in dengue epidemiological studies in Ratchaburi Province, Thailand. Differentially processed GPS data, with a spatial resolution of approximately 1 meter, were incorporated into a GIS for analysis and mapping. Databases associated with a village GIS included village number, *Aedes aegypti* populations, and test results. Epidemiological surveillance for dengue infection through the detection of the dengue